Government of
Saskatchewan

Annual Report
1989-90

Saskatchewan
Energy and Mines

for the fiscal year ending
March 31, 1990

Table of Contents

91-04170/

Letters of Transmittal ____ 3
Organization Chart ____ 5
Finance and Administration Division ____ 6
Resource Policy and Economics Division ____ 9
Geology and Mines Division ____ 13
Petroleum and Natural Gas Division ____ 25

List of Figures

Precambrian Geology Field Projects under the Mineral Development Agreement Program ____ 15
Precambrian Bedrock Compilation Geology Map 17
Mineral Industry Diversification Program Projects 21
Distribution of Inquiries ____ 18
1989-90 Assessment Credits by Activity ____ 20
1989-90 Assessment Credits by Region ____ 20
New Areas Acquired Under Claims, Claim Blocks and Permits ____ 23
Total Areas Under Disposition (Claims, Permits, Leases) ____ 23
Wells Drilled by Area ____ 26
Metres Drilled by Area ____ 26
Remaining Oil Reserves ____ 27
Remaining Gas Reserves ____ 28
Crude Oil Production ____ 28
Quality of Saskatchewan Crude Oil Production ____ 28
Natural Gas Production ____ 28
Average Crude Oil Prices ____ 29
Revenue Received from Sales of Crown ____ 30
Petroleum and Natural Gas Rights ____
Conventional Crude Oil Royalty Curves ____ 32
Wells Capable of Production ____ 33

Letter of Transmittal

The Honourable Sylvia Fedoruk
Lieutenant-Governor
Province of Saskatchewan

Dear Madame:

I have the honour to submit herewith the Annual Report of Saskatchewan Energy and Mines for the fiscal year ending March 31, 1990.

Respectfully Submitted,

Honourable Rick Swenson
Minister of Energy and Mines

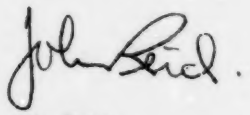
Letter of Transmittal

The Honourable Rick Swenson
Minister of Energy and Mines
Province of Saskatchewan

Dear Sir:

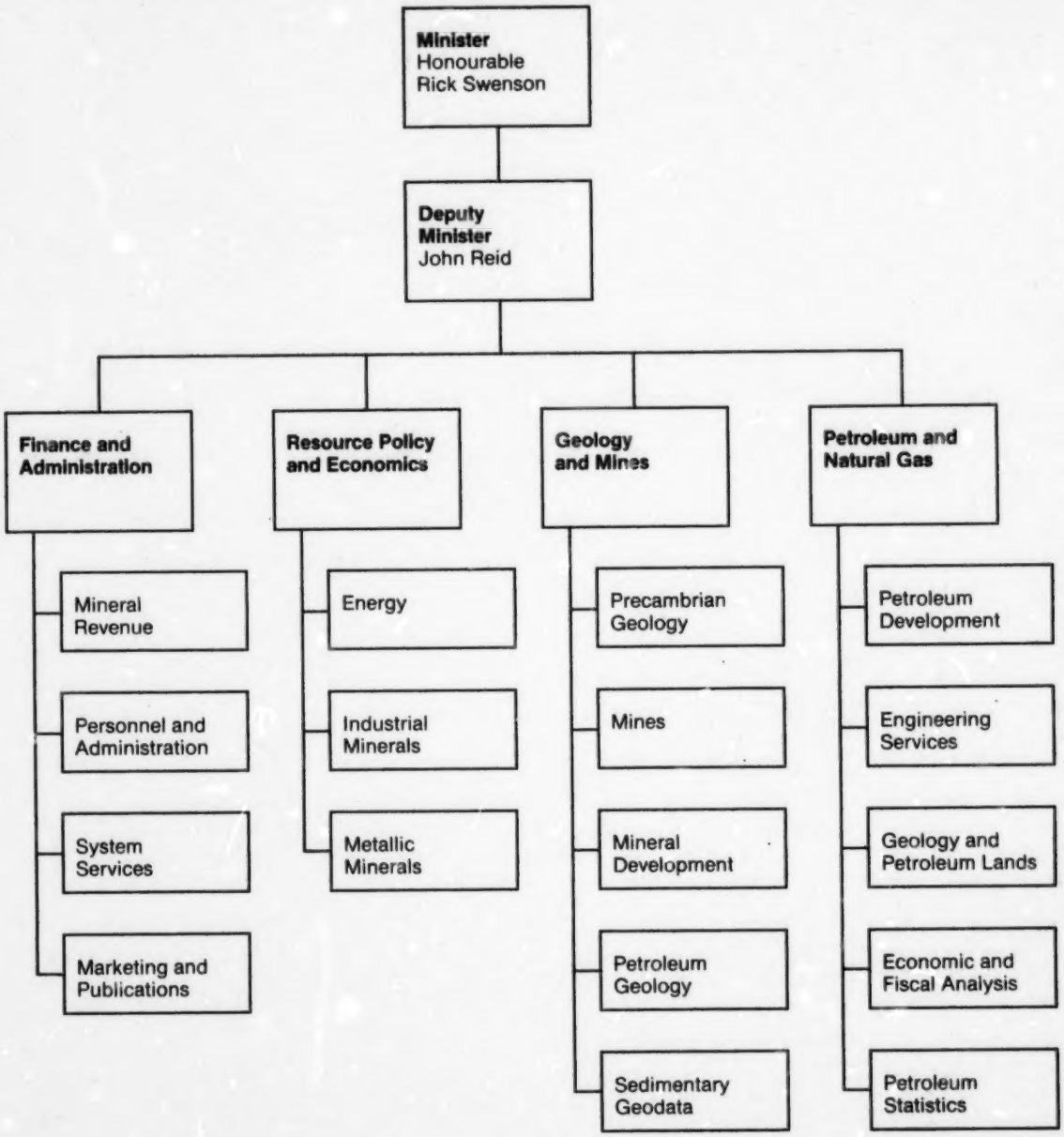
I have the honour to submit for your consideration, the Annual Report of Saskatchewan Energy and Mines for the fiscal year ending March 31, 1990.

Respectfully Submitted,



John Reid
Deputy Minister
Saskatchewan Energy and Mines

Organization Chart



Finance and Administration Division

Ray Clayton
Assistant Deputy Minister

The Finance and Administration Division is responsible for mineral revenue collection and audits, internal administration and personnel, legislative co-ordination, mineral rights, system services, marketing and publications.

The Finance and Administration Division is composed of four branches:

- Mineral Revenue
- Personnel and Administration
- System Services
- Marketing and Publications

Mineral Revenue Branch

The Mineral Revenue Branch is responsible for collecting, recording and accounting for the various resource revenues owing to the province and for maintaining mineral land ownership records. The branch:

- ensures that revenues and accompanying returns and reports are received when due;
- assesses certain kinds of resource revenues on an annual or periodic basis;
- assesses interest and/or penalties on late payments and overdue returns;
- processes revenues through computer and manual systems, as input to financial and management information reports;
- audits resource companies to ensure compliance with taxation legislation;
- maintains historical records of all resource revenues received by the department;
- prepares and registers all mineral land transfers to the Crown through forfeiture and voluntary transfer;
- interprets and verifies mineral land ownership for various branches of the department and for industry;
- maintains a mineral land record of all Crown and freehold mineral ownership, which includes an up-to-date record of all Crown mineral land dispositions in the surveyed area of the province;
- verifies Crown mineral lands available for Crown mineral land disposition sales;
- maintains an up-to-date computerized landfile with data identifying all completed, producing and expired oil and gas wells in the province;
- prepares special reports for use by department officials;
- informs the resource industry of its responsibilities under existing legislation and changes thereto; and
- maintains close liaison with other branches of the department on revenue and mineral ownership matters.

This branch is divided into two sections; revenue operations and revenue monitoring. Revenue operations is responsible for maintenance of the taxroll; receiving and recording of revenue; verification and processing of revenue returns; billing of various royalties, rentals and taxes; taxpayer information and assistance relating to resource taxation legislation, requirements and procedures; maintenance of computer systems and their interface with other department and government systems; processing and payment of incentive grants, compensation payments and payments to holders of trust certificates; follow up of delinquent returns; and collection of accounts receivable. This section also maintains records of all Crown and freehold mineral ownership; verifies Crown mineral lands available for Crown mineral land disposition sales; verifies mineral land ownership for every well that is licensed and maintains a taxable freehold land ownership base for purposes of mineral rights tax assessment.

Revenue monitoring is responsible for office and field audits in all resource revenue areas.

The main objectives of the branch are to ensure that resource revenues owing to the province are received when due, that the amounts paid are correct and properly accounted for, that data is available on a regular and accurate basis for preparation of financial reports, and that a mineral land record of all Crown and freehold land is maintained. To attain these objectives, the branch is committed to a continuous program of review and improvement to existing systems and procedures, or to the development of new systems.

Other objectives include continued and improved communication with taxpayers and the resource industry, greater involvement in policy decisions affecting resource revenues, and training and upgrading of staff to improve the branch's efficiency.

Legislation

The Mineral Revenue Branch administers the revenue provisions of numerous acts and regulations. Among the more significant are:

The Mineral Resources Act, 1985

The Oil and Gas Incentive Regulations

The Delayed Payment Charges Regulations, 1970

The Freehold Oil and Gas Production Tax Act and Regulations

The Mineral Taxation Act, 1983

The Freehold Coal Production Tax Regulations

The Mineral Rights Tax Regulations

The Crown Minerals Acts, 1985

The Coal Disposition Regulations, 1988

The Petroleum and Natural Gas Regulations, 1969

The Mineral Dispositions Regulations, 1986

The Builders' Lien Act

Revenues

A decrease of only 1.0 per cent in total resource revenues occurred during this fiscal year. Decreases in potash, uranium and other minerals exceeded the 28.8 per cent increase in oil and gas revenue. Total revenue during 1989-90 amounted to $352.0 million, a decrease of $3.5 million over 1988-89.

Source of Revenue	1989-90	1988-89	Per cent Increase (Per cent Decrease)
Heritage Fund			
Oil and Gas	$ 288,837,906	$ 224,199,015	28.8
Potash	31,335,233	96,080,234	(67.4)
Uranium	15,552,944	17,517,321	(11.2)
Other Minerals	16,288,062	17,738,643	(8.2)
Total	$ 352,014,145	$ 355,535,213	(1.0)
Consolidated Fund			
Mineral Land Tax	$ 5,638,778	$ 5,629,383	0.2
Interest and Penalty	3,706	11,055	(66.5)
Sales, Services, etc.	325,839	330,681	(1.5)
Receipts from other Governments	NIL	574,000	—
Total	$ 5,968,323	$ 6,545,119	(8.8)

Incentives and Compensations

With the wind-down of the Incentive Grant Program, payments in 1989-90 were only $115,000 compared to $11,165,385 in 1988-89. Compensation payments to former mineral owners were $2.8 million in 1989-90 compared to $2.5 million paid in 1988-89.

Certain mineral rights surrendered to the Crown were encumbered by gross royalty trust certificates. As these lands are leased and brought into production, the branch pays the applicable gross overriding royalty. Payments in 1989-90 totalled $104,176 compared to $70,196 in 1988-89.

Personnel and Administration Branch

The responsibility of the Personnel and Administration Branch is to provide effective human resource and administrative support services to all employees of Saskatchewan Energy and Mines.

The human resource functions include:

- Managing and facilitating staffing actions in a manner that ensures quality and timeliness.
- Providing employee benefits administration and general personnel services that are both responsive and timely.
- Managing classification activity ensuring appropriateness, consistency and timeliness.
- Providing advice on department organization structures.
- Encouraging improved employee performance through the identification, facilitation and assessment of staff development.
- Fostering a positive employee relations environment by encouraging and facilitating recognition based on performance, communications with employees and their representatives and fair and consistent treatment.
- Promoting a working environment in the branch that emphasizes teamwork, communication and individual growth and development.

The administrative support services function include:

- Assisting in the development of a departmental budget that meets program requirements within the context of fiscal restraint.
- Providing timely expenditure forecasts to assist in financial decision making and budget management.
- Ensuring that goods and services required in the discharge of department functions are acquired in an orderly and timely fashion, and that the bills are paid promptly.
- Providing adequate working space and equipment for all employees.
- Developing and maintaining appropriate records to meet the requirements of central agencies.

Some of the noteworthy activities and accomplishments during the year included:

- A vacancy management program was implemented to assist in achieving budgetary objectives.
- Thirty-three summer students were employed primarily for geological field activities in northern Saskatchewan and for office functions.

- A Staff Development Plan involving 419 participant days in training was developed and implemented.
- A pilot project to develop a career planning process for two branches was successfully implemented.
- The department was in the top 5 per cent of all government departments in terms of consistently meeting targetted timelines in the processing of invoices.
- All outstanding employee grievances had been resolved by year end.
- A non-smoking policy was successfully implemented.
- A new manual, Administrative Guidelines for Project Geologists, was developed to assist in the administration of field activities.

System Services Branch

System services provides planning, management, consulting and co-ordination support functions for the development of new and the maintenance and operation of existing information systems for the department. This includes responsibility for the evaluation and acquisition of computer hardware and software, data-entry, data security, word processing co-ordination and support. The branch also develops and manages the department's computer services budget.

System analysis, development, and maintenance are performed by branch staff or co-ordinated with consultant services. The department currently operates 18 computer systems on a regular production basis.

The automated systems use a variety of equipment and computers. The branch operates a remote job entry terminal that provides the communications link between the department and Westbridge computers. In addition, on-line terminals and micro computers are available for on-line data processing, program development and maintenance.

The following major projects were undertaken:

- Detail design and initial development of Production and Disposition System.
- Major expansion of the existing micro-computer network.
- Implementation of a micro-computer network at the Geological Subsurface Lab.
- Installation of a mapping software for colour map production.
- Installation of an Integrated Building Distribution Network to provide a flexible cabling system for all computer equipment.

Marketing and Publications Branch

Marketing and Publications is responsible for the production, promotion, sales and distribution of information on Saskatchewan resources.

Technical and regulatory information is routinely updated and new publications are prepared as data becomes available. This material is promoted through direct mail, advertisements in trade journals and participation at trade shows and conferences. Sales of technical information totalled $294,753 in 1989-90 compared to $245,666 in the previous year.

This branch provides central information services such as the department inquiry line and print information prepared for the general public and for use in schools. The most common general information package is a series of fact sheets on Saskatchewan resources and a sample set of minerals common to the province.

Marketing and publications staff also maintain a resource library for use of staff and industry; co-ordinate the department book and journal orders and provide a daily newspaper clipping service for internal use.

Resource Policy and Economics Division

The Resource Policy and Economics Division conducts research and analysis of policy issues related to energy and mineral resource development. Information and recommendations are provided to government for the formulation of policies respecting such matters as: rate of development of the province's energy and mineral resources; pricing and taxation of resources; market access and development; research, development and demonstration activities; and nonconventional and renewable energy resources. The division also negotiates with the federal government and other provincial governments on issues of mutual concern in the mineral and energy sectors.

Specific objectives of the Resource Policy and Economics Division are to:

- Monitor and analyse the energy and mineral resource markets, industry structure, government policies in other jurisdictions, and comparative fiscal systems to provide informed assessments for senior management on emerging issues and industry performance.
- Review, modify and develop appropriate policies, strategies and fiscal instruments for the energy and mineral sectors.
- Produce timely and accurate long-term forecasts of production, sales, price, royalty revenue, employment and investment in the energy and mineral sectors for policy development, macro-economic forecasting and fiscal planning purposes.
- Negotiate major federal/provincial fiscal issues and arrangements.
- Develop and manage royalty and tax systems for the industrial and metallic mineral resources of the province in order to maintain a balance between a fair economic return to the province and incentives to industry.
- Maintain an awareness of technology issues, problems and opportunities and, consequently, develop policies and strategies that will lead to the more cost-effective and efficient recovery and utilization of our mineral and energy resources.
- Design and deliver appropriate research, development and demonstration funding programs for the fossil fuel sector and tax incentives for the mineral sector.

The Resource Policy and Economics Division is composed of three branches:

- Energy
- Industrial Minerals
- Metallic Minerals

Energy Branch

The main functions of the Energy Branch are to:

- conduct strategic, market and economic analysis for the development of the province's fossil fuel resources, primarily heavy oil, coal and natural gas;
- participate in federal/provincial negotiations on issues of joint interest in the energy sector;
- develop policy options to address problems and opportunities in energy resource development and taxation;
- prepare and co-ordinate economic and revenue forecasts for the energy sector; and
- monitor and encourage research, development and demonstration initiatives related to petroleum and lignite.

The Energy Branch is structured to comprise a Policy Section and a Technology Section.

Policy Section

Oil

The oil related activities of the Policy Section of the Energy Branch in 1989-90 reflected the following issues:

- The section monitors barriers to free trade with the United States. An upswing in oil prices during the year moderated pressures in the United States for discriminatory policies such as an oil import fee. The Superfund levy, previously levied at a higher rate on imported oil in contravention of a GATT ruling, was equalized this year for imported and U.S. domestic oil. Customs excise fees, also found by GATT to be inconsistent with free trade, continued to be levied on imported oil, but at a declining rate in accordance with the Free Trade Agreement.
- Takeovers of Canadian oil and gas companies by foreign companies are reviewed by the section to facilitate Saskatchewan Trade and Investment's assessment of the impact on Saskatchewan.

Natural Gas

The Policy Section of the Energy Branch was instrumental in developing natural gas deregulation policies for Saskatchewan and continues to monitor and evaluate the impact of these policies.

The Canadian natural gas sector continues to go through a period of transition and restructuring as a result of implementation of the Agreement on Natural Gas Markets and Prices signed in October, 1985. The intent of the agreement was to reduce significantly the degree of government regulation of natural gas markets allowing prices to be determined through negotiation between buyers and sellers and giving producers and consumers access to competitive markets. Throughout 1989-90, the

Policy Section of the Energy Branch participated in the Gas Monitoring Committee which represents all signatory governments to the agreement.

The impact of the deregulation initiatives has been substantial. A major expansion of the natural gas industry in Saskatchewan began with deregulation and continued over the past year:

- Land sale activity in gas prone areas, an early indicator of prospective development, grew from $4.4 million in 1986 to $21 million in 1989. A record number of 960 exploration and development wells were drilled and completed in 1989.
- New reserves continued to exceed production.
- Production of marketable natural gas of 194 billion cubic feet in 1989 exceeded the 1988 level of 144 billion cubic feet.
- Consumers have access to more reasonably priced natural gas.
- Crown revenues have increased to over $35 million.

The Policy Section administers both gas removal and gas use permits. One hundred and forty-two removal permits were issued to 34 producers. Eighty-two gas use permits were issued to 77 Saskatchewan consumers buying from 10 different producers.

The Policy Section also monitors activities of federal regulatory agencies. In 1989-90 the section prepared a submission to a National Energy Board hearing on the continued use of benefit-cost analysis for natural gas export licence approvals. The Board ruled in agreement with the department's position that this analysis was inappropriate in determination of approvals for natural gas export licences.

Coal

The coal related activities of the Policy Section of the Energy Branch in 1989-90 centered around the following issues:

- A major review of coal royalties and taxes initiated in the prior year continued through this year. Consultations were initiated with producers to obtain their views of the existing system and of conceptual alternative systems for royalties and taxes. This review will be completed in the next year.
- Analyses of several market related issues were also completed. The issues included pipelining coal, demand-supply policies of Ontario Hydro and the competitiveness of Saskatchewan coal vis-a-vis other jurisdictions.
- The section also assisted in an inter-provincial study on transportation issues related to western Canadian coal sales to Ontario undertaken by the Action Committee on Western Canadian Low-Sulphur Coal to Ontario.
- Economic and revenue forecasts for the coal industry are regularly done by the section in response to requests from Executive Council and the Department of Finance. From time to time the section also undertakes a study of special policy issues raised by the industry.

Technology Section

The Technology Section of the Energy Branch encourages projects involving the research, development and application of innovative technologies which permit more efficient production of Saskatchewan's large petroleum and lignite coal resources. The development of improved fossil fuel technologies enhances resource development opportunities which, in turn, stimulates Saskatchewan's economic development and diversification.

The Technology Section provides support to desirable fossil fuel research, development or demonstration projects under the terms of the Saskatchewan Fossil Fuels Technology Development Program. The section also monitors research initiatives in Saskatchewan, throughout Canada and in other countries to retain an up-to-date perspective on new fossil fuel technologies. These technologies are evaluated to determine if there are any opportunities to apply them within Saskatchewan. The section also advises the department regarding alternative energy and energy conservation issues.

The Technology Section represents Saskatchewan on the Intergovernmental Secretariat which was established by the Action Committee on Western Canadian Low-Sulphur Coal to Ontario. This Committee is investigating means of improving the competitiveness of western Canadian coal in the Ontario market through projects which are co-operatively supported by the private sector, the federal government, and the Governments of Ontario, Saskatchewan, Alberta and British Columbia.

The Technology Section was also responsible for completing the implementation of the Canada-Saskatchewan Heavy Oil Agreement and the Canada-Saskatchewan Heavy Oil/Fossil Fuels Agreement. These federal/provincial agreements expired at the end of 1987-88, but a limited amount of funding was set aside for allocation in 1988-89 and 1989-90 to complete several outstanding project commitments.

The Technology Section represented Saskatchewan on the Task Force on Energy and the Environment which was established to advise federal/provincial/territorial Energy Ministers regarding energy-related emissions of greenhouse gases and the effect of adopting a goal of reducing carbon dioxide emissions by 20 per cent of 1988 levels by the year 2005. The task force submitted a report to the

Energy Ministers in August, 1989. The Energy Ministers reviewed the report and directed the task force to undertake an extensive regional analysis of the potential impacts of greenhouse gas emissions and global warming, and to examine, on a provincial basis, the most cost effective measures for reducing greenhouse gas emissions.

The Saskatchewan Fossil Fuel Technology Development Program

The Saskatchewan Fossil Fuel Technology Development Program was established to develop the technologies required to reduce the technical constraints limiting the development of Saskatchewan's fossil fuel resources.

Late in 1989-90, the provincial government decided to phase out the Fossil Fuel Technology Development Program. Sufficient funds were approved for the 1990-91 fiscal year to meet all existing funding commitments and to permit an orderly completion of activities initiated by the Program.

In 1989-90 the Technology Section of the Energy Branch provided over $1,354,000 in funding to the following projects:

- Winter Field Horizontal Well Project.
- Micro-FTIR, UV-Fluorescence, and Pyrolysis of Coal.
- Land Application of Oil and Gas Drilling Wastes in Saskatchewan.
- Resource Evaluation Study of Saskatchewan Lignite.
- Horizontal Drilling Systems Study.
- Preparation of Saskatchewan Lignite for Liquefaction in Japan.
- Autoclave Tests on Saskatchewan Feedstocks Under Low Pressure.
- Scaled Physical Model Evaluation of the Steam Injection Process.
- Carbon Dioxide Disposal in Brines.
- An Assessment of Technologies and Policy Options for Reduction of Greenhouse Gases Emissions in Saskatchewan.
- Enhanced Oil Recovery From Carbonate Reservoirs by Chemical Flooding.
- UBC Sulphur Capture Fluid Bed Gasification Tests.

Further information is available from the Technology Section regarding projects which have been funded by the section.

Industrial Minerals Branch

The main functions of the Industrial Minerals Branch are to:

- undertake strategic, market and economic analyses for the development for the province's industrial mineral sector, primarily potash;
- develop policy options to address problems and opportunities in the industrial mineral sector;
- design and implement royalty and tax systems for the production of industrial minerals including responsibility for legislation and regulations;
- design and implement incentive programs to support industry's efforts in market development and research and development; and
- prepare economic and revenue forecasts for the industrial minerals sector.

During 1989-90, members of the Industrial Minerals Branch:

- prepared and updated long term forecasts of world potash markets;
- developed revenue forecasts of the industrial mineral sector for fiscal budgeting and planning purposes;
- prepared monthly analyses of potash markets and Saskatchewan industry performance for senior management and ministerial use;
- continued to administer the market development and research and development incentive program;
- continued and concluded consultations with the industry in developing a new tax system specified in legislation and regulations to replace the Potash Resource Payment Agreements (PRPA);
- developed new legislation and regulations for *The Potash Production Tax Schedule in The Mineral Taxation Amendment Act, 1989*, and
- *The Potash Production Tax Regulations*, which replaced the PRPA on January 1, 1990;
- evaluated the market development programs implemented by the potash industry; and
- completed a market analysis paper of the sodium sulphate industry.

During the year the branch continued to review royalty regimes for other industrial minerals and worked closely with the Mineral Revenue Branch to resolve questions arising from the administration of the taxes and royalties payable by the producers of industrial minerals in the province.

Metallic Minerals Branch

The main functions of the Metallic Minerals Branch are to:

- conduct strategic, market and economic analyses for the development of the province's metallic mineral sector, primarily uranium and gold;
- develop policy options to address problems and opportunities in metallic mineral development;
- develop provincial positions and negotiate with the federal and other provincial governments on metallic mineral matters;
- design and implement royalty and tax systems for the production of metallic minerals including responsibility for legislation and regulations;
- review sales contracts to ensure fair market value is received for Saskatchewan uranium; and
- prepare economic and revenue forecasts for the metallic minerals sector.

Principal activities of the Metallic Minerals Branch in 1989-90 included:

- the drafting of uranium royalty amendment regulations in preparation for a new royalty structure;
- consultations with industry with respect to outstanding concerns related to the administration of the royalty regulations and the follow-up drafting of amending regulations;
- the preparation of monthly analyses of uranium markets for the use of senior management;
- the development and updates of long term market and revenue forecasts;
- serving as technical advisors to the Saskatchewan Department of Education regarding curriculum materials on the uranium industry;
- liaison with other provincial departments particularly those involved in the regulation of the uranium mining industry;
- analysis and advice to the government regarding a broad range of uranium and nuclear related issues of general concern to the Saskatchewan public;
- input to special reports on taxation and other issues related to the Federal/Provincial mines ministers meetings.

Geology and Mines Division

Les Beck
Executive Director

The division is responsible for the maintenance of the departmental geoscience data base; storage and synthesis of exploration, mining and production data submitted by industry; and disposition of all Crown minerals other than petroleum, natural gas, oil shales and helium.

The principle role of the division is to promote exploration and development opportunities for the petroleum and mineral industries in the province through publications, technical data-bases, core collections, symposia, open house meetings and by responding to direct inquiries from industry and the general public.

The responsibilities of the division are undertaken by five branches; Precambrian Geology Branch, Sedimentary Geodata Branch, Petroleum Geology Branch, Mineral Development Branch and Mines Branch, together with a Support Services Section which carries out cartographic drafting and editorial duties for the division and provides general drafting services for the department.

Since the federal government made no commitment to a new mineral development agreement the provincial government implemented The Mineral Industry Diversification Program. This program allowed the department to pursue expanded geological research activities in order to maintain exploration momentum in the province and to promote industry activity in a number of sectors including gold, base-metals, platinum, diamonds, high-tech minerals and industrial minerals. Geological mapping and mineral deposit studies funded by the program focussed on gold-bearing areas east of La Ronge and base-metal potential in the Flin Flon- Hanson Lake area. A new program was implemented to enhance the data base for the newly emerging diamond exploration play. The fiscal year saw a continuation of high levels of staking in the Southern Mining District, most of it in connection with the search for diamonds. During the year, discussions continued with the federal government concerning a new mineral development agreement. Agreement-in-principle was reached concerning the general scope of the new program but at year end the question of federal funding remained unresolved.

Support Services Section

The Support Services Section handles the editing, formatting and production of all geoscientific reports and maps published by the division and, in addition, provides drafting services to the rest of the department. A desk-top publishing system and laser printer are used to produce the annual Summary of Investigations at a high level of quality, as well as in the production of final reports, open file reports and data files.

The drafting section consists of two working units: Survey Drafting and General Drafting.

The Survey Drafting Unit prepares thematic monochrome and colour maps and text figures to the plate-ready stage. These include compilation bedrock geology and metallogenic maps at 1:250,000 scale, outcrop geology and contour maps at various scales, stratigraphic cross-sections, and small size maps and figures for inclusion in reports and externally published scientific papers. During the fiscal year, the unit produced five publications comprising 288 pages and 30 maps and reprinted two reports and a brochure. In addition, approximately 25 per cent of the cartographic staff's time was spent on special projects such as text figures for magazine articles and papers in scientific journals, slides for conference presentations, graphics for conference displays and promotional material for the department. The addition of a computerized colour map production system at the end of fiscal 89-90 will speed up the production of colour geological maps.

The General Drafting Unit maintains the mineral disposition maps, petroleum well location maps, petroleum pool boundary maps and potash and coal lease maps. They also prepare the maps for the quarterly Petroleum Land Sale, produce an annual update of the coloured Mineral Development Map, prepare numerous text figures, slides and graphics for all areas of the department, and handle small blueprint orders for internal use and for sale through the Marketing and Publications Branch.

In response to the continued diamond staking activity in the southern part of the province an additional six 1:50,000 and six 1:250,000 scale Mineral Disposition Maps were added to the department's inventory.

1989/90 Publications

Bennett, R.W. (1990): Assessment Work Catalogue, Reindeer Area Saskatchewan; Sask. Energy Mines, Misc. Rep. 90-5, 283p.

Macdonald, R., ed. (1989): Summary of Investigations 1989, Saskatchewan Geological Survey; Sask. Energy Mines, Misc. Rep. 89-4, 192p (plus 22 maps).

MacDougall, D.G. (1989): Metallogenic Map Series, Ile-a-la-Crosse, NTS Area 73O; Sask. Energy Mines, Rep. 234, 14p (with 1:250,000 scale map).

Pearse, H.K. (1990): Building Stone Potential in the Creighton-Denare Beach Area of Saskatchewan; Sask. Energy Mines, Open File 90-1, 28p (plus 2 maps).

Ramaekers, P. (1990): Geology of the Athabasca Group (Helikian) in Northern Saskatchewan; Sask. Energy Mines, Rep. 195, 49p (plus 4 maps).

Slimmon, W.L. (1989): Compilation Bedrock Geology, Fond-du-Lac, NTS Area 74O; Sask. Energy Mines, Rep. 247 (1:250,000 scale map with marginal notes).

Slimmon, W.L. (1990): Fond-du-Lac Geological Bibliography, NTS Area 74O; Sask. Energy Mines, Data File 14, 9p.

Reprints

Byers, A.R. and Dahlstrom, C.D.A. (1954): Geology and Mineral Deposits of the Amisk-Wildnest Lakes Area, 63L-9, 63L-16, Saskatchewan; Sask. Energy Mines, Rep. 14, 177p, (reprinted 1970, 1989).

Byers, A.R., Kirkland, S.J.T. and Pearson, W.J. (1965): Geology and Mineral Deposits of the Flin Flon Area, Saskatchewan; Sask. Energy Mines, Rep. 62, 95p, (reprinted 1989).

Precambrian Geology Branch

The Precambrian Geology Branch maintains an ongoing geological inventory of the geology, geochemistry and related geoscience data of the northern Precambrian Shield region and other subsurface Precambrian rocks in the province. The information, which is produced in reports, maps, data files and through presentations and consultations, is used primarily to promote and assist the mineral exploration industry working in province, as well as supporting other development and diversification programs, including in more recent years growing demands for environmental studies.

Archival geoscience information is maintained in a number of active databases. Incremental data were acquired in 1989-90 under the new provincial Mineral Industry Diversification Program (MIDP). As for the previous Canada-Saskatchewan Mineral Development Agreement (MDA) 1984-1989, the MIDP is aimed mainly at promoting mineral exploration in northern Saskatchewan, and includes geological mapping, geochemistry, isotope geology and related mineral deposit studies largely in areas undergoing active exploration for gold and base metals. Precambrian expenditures in 1989-90 on the program amounted to approximately $600,000.

Following the upswing in markets prior to the beginning of the year, the exploration industry in northern Saskatchewan turned its attention to base metals as well as gold. The completion of the airborne gradiometric survey over the eastern part of the Shield edge east of Limestone Lake (under the recent MDA), and the recent Cameco-Trimin base metal discovery at McIlvenna Bay, Hanson Lake has drawn attention to the potential for base metals in that region, particularly immediately south of the Precambrian Shield edge. Regional mapping and other studies under the MIDP have in consequence largely supported gold and base metal exploration.

Northern Bedrock Reconnaissance

The bedrock geology of about 16,000 square kilometres in northern Saskatchewan is still unmapped. Reconnaissance mapping at 1:100,000 scale was resumed after a gap of several years with completion of the Misaw Lake sheet area, NTS 64M-NE (Fig. 1A). A 1:50,000 scale geological map was also made of the Hatle Lake area, NTS 64M-NW (Fig. 1B). Both areas have potential for gold and base metal mineralization. Gold mineralization similar to that found recently at Ithingo Lake farther south may be present in the region. Hurwitz Group rocks mapped in the area have a similar setting to the Shear Lake gold deposit in the District of Keewatin, and there is potential for mineralization underlying the Hurwitz which contains abundant gossans and pyritic quartz stringers. The most significant mineralization in the Hatle Lake area is the Nirdac Creek gold occurrence. Volcanic rocks in the area also have potential for base metal and shear-zone hosted gold mineralization.

Gold Belt Geology

This program entailed 1:20,000 scale bedrock remapping and supporting studies of areas of high gold potential:

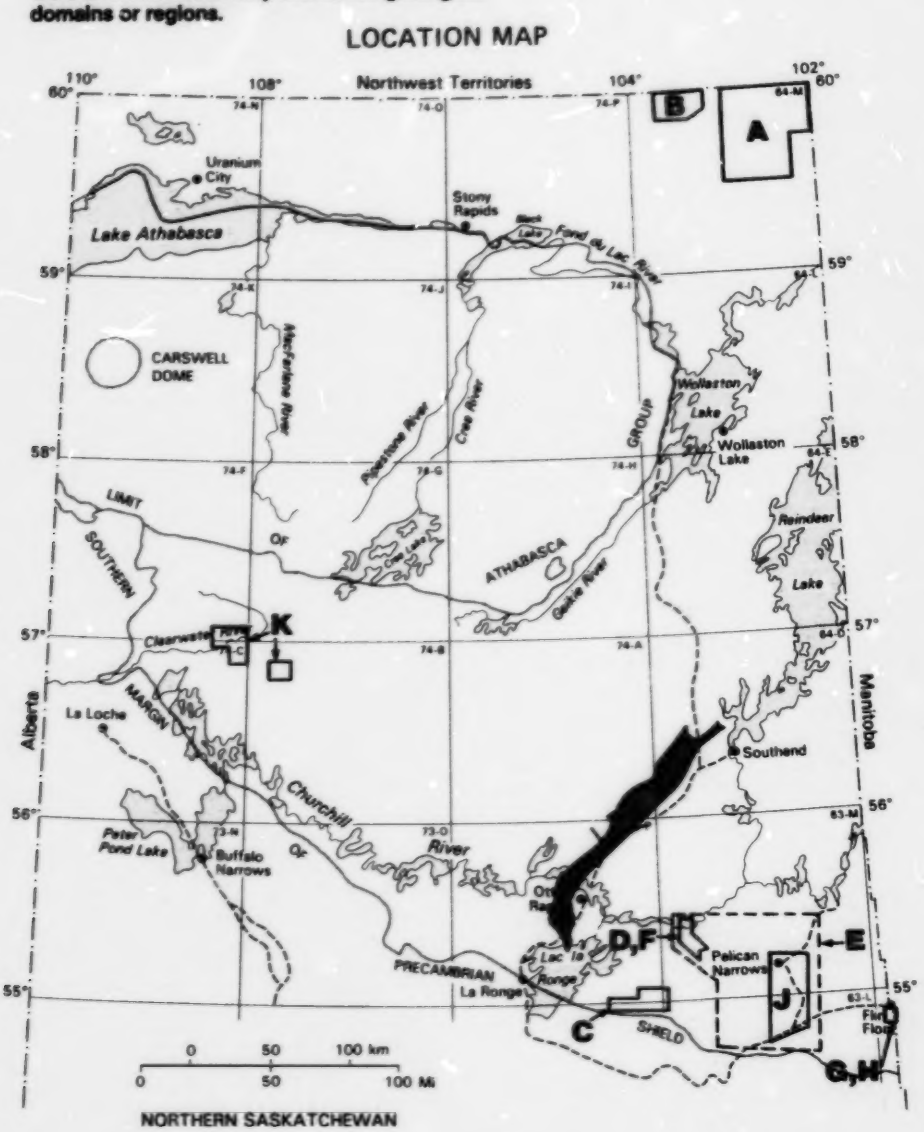
- Bedrock remapping of the Brownell Lake area was extended westwards into the Wapawekka Lake area (Fig. 1C). The area is occupied by a belt of greenstones with zones favourable for gold mineralization. A number of new gold exploration targets were defined.
- Bedrock remapping of the Gee Lake area was extended into Sadler Lake (Fig. 1D). Previous mineral exploration was mainly directed at base metals occurring in gossan zones. Samples collected from one rock body returned elevated nickel and chromium values.
- Supporting geoscience studies in the southeastern part of the Precambrian Shield included P-T-t studies (University of North Dakota, Fig. 1E), Lithogeochemistry (University of Regina, Fig. 1F), and Geochronology (Geochronological Laboratory of the Geological Survey of Canada, Ottawa).

Metallic Minerals Diversification:

Projects under this heading were designed to provide more regional information for base metal and platinum group metals exploration:

- A new program was commenced in 1989-90 to remap in detail the volcanic and associated formations of the Flin Flon region (Fig. 1G). Similar mapping was started several years ago on the Manitoba side of the border and has proved successful in tracing favourable base metal environments. The area immediately south of Creighton has excellent rock exposure and the mapping was commenced at 1:12,500 scale. Formations with a potential for containing massive sulphide deposits were traced south from the Flin Flon deposit. Numerous gold-bearing veins were also traced. The mapping was supported by lithogeochemical studies (University of Regina, Fig. 1H).

Fig. 1 - Precambrian Geology field projects under the Mineral Industry Diversification Program (MIDP). Letters show approximate location of projects described in text. LRGB = 'La Ronge Gold Belt'. The base map shows the geological domains or regions.



NORTHERN SASKATCHEWAN

- A small study was carried out jointly with professors from the Universities of Saskatchewan and Regina to review the geology of the Pelican Narrows-Jan Lake area (Fig. 1J). A major reinterpretation was proposed, which will have implications for exploration.
- Field work on the "Snowbird Transect" project was completed during the summer (Fig. 1K). This is a joint venture with the Universities of Kansas and the University of California, Santa Cruz campus, aimed at examining a cross section of a major geological boundary (the Snowbird lineament) and its environs in the western part of the Shield. The project includes field mapping by three graduate students, coupled with geochemical and U-Pb/Nd-Sm isotopic and geochronological studies. The westernmost area has potential for platinum group metals. Nepheline syenites, rarely found in Saskatchewan, were identified in the central part of the lineament.

Kimberlite (Diamond) Studies

With the advent of the diamond exploration play in the southern part of the province, a report on Nd-Sm and other isotope studies was issued (Universities of Regina and California, Santa Cruz) and published in the Summary of Investigations 1989. The report, based upon samples collected in deep oil exploration wells, describes broad geological terrains occurring in the Precambrian basement underlying the southern part of the province. This information is of value in predicting the occurrence of kimberlitic (potentially diamond-bearing) pipes.

Precambrian Geodata

The regional geoscience databases include rock and mineral sample collections and other files. These files are used in-house and are also available on an increasing scale for consultation by industry and others. All files are now housed on microcomputer. Work was continued on the Geochronology and Precambrian Lexicon databases. The Saskatchewan Precambrian Bibliography database was transferred to new software and brought up to date. Consolidation continued in the provision of microcomputer systems.

Publications and Presentations

Published and open file reports are issued periodically, based upon field programs, consultant's reports and in-house compilations.

One new coloured compilation bedrock geology map at 1:250,000 scale was produced (Fond-du-Lac, NTS 74-O), and work continues on other maps (Fig. 2).

Branch geologists contributed the major part of the Saskatchewan Geological Survey Open House presentation in November 1989, attended by mineral industry representatives from across Canada and the U.S.A. Presentations were also made at other meetings held in North America.

Sedimentary Geodata Branch

Industrial Minerals Section:

The section is responsible for planning and implementing investigations relating to industrial minerals; it provides informational and advisory services to industry, government agencies and the public on resources and technical matters and it also plays a role in the regulatory aspects of industrial minerals.

Exploration and development of the province's industrial mineral resources are monitored through personal communications and the evaluation of technical submissions by industry. This information, in conjunction with in-house projects and knowledge of changing markets and technology, help provide direction for the investigations of the branch, as well as industry.

The section maintains a manual resource data base on industrial minerals as well as technical information on utilization, specifications and processing.

Records of assessment work conducted under the Quarrying Regulations, The Coal Disposition Regulations and The Subsurface Mineral Regulations are maintained by the section.

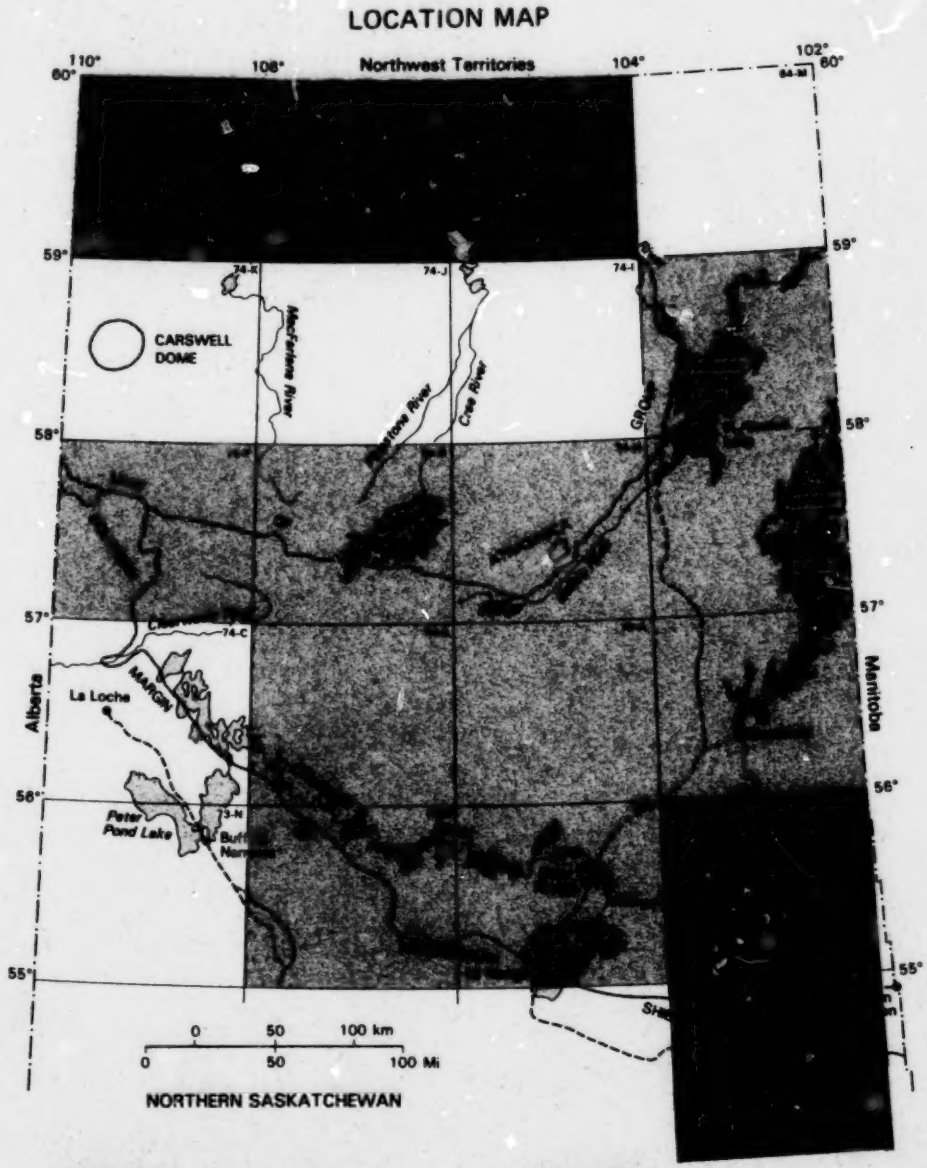
The section also contributes to the review of Environmental Impact Assessments on proposed mineral developments in the Sedimentary Basin area of the province.

Several projects were underway or completed during the fiscal year under the Mineral Industry Diversification Program (MIDP), the Canada-Saskatchewan Mineral Development Agreement (MDA) or under the consolidated budget (CB).

These are:

- preliminary evaluation of the building stone resources in east-central Saskatchewan (contracted under MIDP). The project is to continue in 1990-91.
- completion of a Federal (MDA) brochure on stone in Saskatchewan.
- participation in a joint federal/provincial project to determine recoverable coal reserves in southern Saskatchewan (CB). The Estevan coal field was completed during the year.
- an investigation of anomalous conditions in the Phanerozoic Basin of Saskatchewan and their potential relevance to kimberlite occurrences (MIDP). The project is to continue in 1990-91.

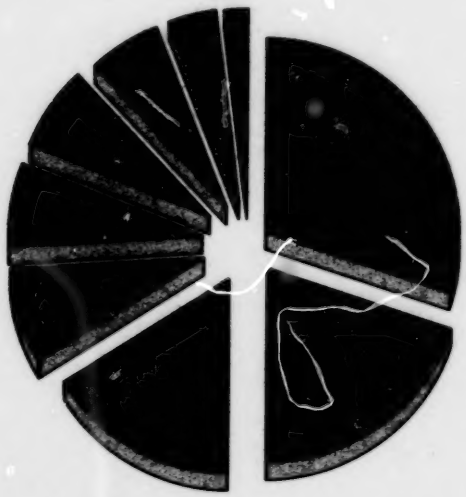
Fig. 2 - Precambrian Bedrock Compilation Geology Maps, 1:250,000 scale.



- interpretations of air photos and remote sensing data in the Prince Albert area and their application to kimberlite exploration (MIDP, Contracted to the Saskatchewan Research Council).
- a compilation of data on the availability and markets of structural industrial minerals in Saskatchewan, (MIDP, contracted to the Saskatchewan Research Council).
- investigation of the major processes leading to the deposition and preservation of potash salts in the Prairie Evaporite in Saskatchewan (completed in-house).
- continued investigations of subsurface high salinity brines as a potential mineral resource in Saskatchewan (CB). The project will continue during 1990-91.

The section handled approximately 240 major enquiries relating to industrial mineral resources, technology and markets. Most had originated from industry and government agencies. Figure 3 illustrates their distribution by commodity or group.

Figure 3 - Distribution of Industrial Mineral Inquiries



Based on the frequency and nature of inquiries the three most active commodity based areas of interest during the fiscal year were diamonds, building stone and kaolin. Since the announced discovery of kimberlites in Saskatchewan in 1988 and 1989 the level of general interest and exploration for diamonds has soared. The substantial demand for related basic technical information for the sedimentary basin is being addressed by the section through the Phanerozoic anomalies study and other related projects. Similarly, a strong growth in the use of building stone, especially granite, in North America and many other parts of the world has stimulated interest in new undeveloped resources in more remote areas. Building stone resource investigations by the section are designed to stimulate further exploration and, ultimately, development in Saskatchewan.

The rapid growth and planned developments in the paper industry in Western Canada and the general interest in clay fillers and extenders have placed Saskatchewan kaolin resources in the forefront. Interest in the developmental potential of the Saskatchewan resource for western markets is stimulated by the present domination of the market by a distant single southeastern United States source area and the reported large provincial reserves and their favourable response to upgrading processes.

Well Records and Geophysical Data Section:

The section maintains a central repository of information from wells drilled under the Oil and Gas Conservation Regulations. Information is received, processed, entered into the on-line computerized system and filed. The section also receives and processes preliminary and final plans, monthly and final reports and geophysical maps submitted by industry under the Sedimentary Basin Geophysical Exploration Regulations. The manual and computerized data files are the basis for servicing industry, government agencies and the public. The unit also compiles indexes of geophysical data for quarterly petroleum and natural gas land sales. During the fiscal year work continued on the computerization of the geophysical map and report files and the preliminary geophysical plans. Work was completed on the computerization of the seismic velocity surveys and the structure test hole files. As a result catalogs are now available for these and part of the seismic map inventory.

The principal statistics relating to the work of section are summarized in the following table:

Well Files	**1989/90**
Data submission by industry	10,220
Files pulled	26,470
Photocopies for industry	37,830
New files set up	1,301
Letters requesting delinquent data	196
New wells coded and computerized	2,058
Supplementary data added to system	2,947
Computer searches	243

Geophysical Data	
Preliminary plan numbers issued	284
Final plans approved	243
Monthly reports processed	210
Geophysical maps reproduced for industry	718
Total seismic line kilometres recorded	8,054
Total revenue generated by information services	$55,140.00

Petroleum Geology Branch

The Petroleum Geology Branch, occupies the Subsurface Geological Laboratory Building at 201 Dewdney Avenue East, Regina and comprises a Geology Section and a Warehouse Section.

Geology Section

The goal of this group is to increase both the quantity and quality of geological information available to petroleum geologists and others interested in the sedimentary rocks of Saskatchewan. This is done by adding new information to, and upgrading information already in, the Well Information System; by undertaking geological research projects leading to published papers or reports; and by giving consultations on request to interested geologists.

Over the last year:

- stratigraphic information was processed from 1,556 newly licensed wells and added to the Well Information System
- the stratigraphy of several hundred older wells was reviewed as part of the New Atlas studies and this information was used to upgrade the Well Information System.
- Three major projects continued:
  - Geology of the Medicine Hat Sand (Cretaceous) in Southeastern Saskatchewan.
  - Development of a Depositional Model for the Oil-Prone Jurassic Section in the Wapella-Moosomin Area, Southeastern Saskatchewan (Report now in preparation).
  - Geology of the Interlake Group (Silurian) in Saskatchewan.
- Three smaller projects were undertaken as contributions to the New Geological Atlas of Western Canada
  - Basal Clastic Slice
  - Ordovician and Silurian Carbonate Slice
  - Colorado Slice
- Four geological research projects were supported at University of Regina.
- Five professional papers were presented and/or published
- Numerous consultations were given to industry geologists
- Several workshops on Introductory Geology were arranged for schools (both student and teacher groups), for University students and interested members of the general public.

Warehouse Section

This group handles geological materials in the form of drill cuttings, cores and Precambrian field specimens. The material is processed and stored in the warehouse to be brought out for examination upon request by visiting geologists.

Over the last year:

- New cores were received from 284 wells for a yearly total of 4,287 boxes bringing total number of boxes in storage to 263,957.
- New drill cutting samples were processed from 363 wells for a yearly total of 26,529 vials bringing total number of vials in storage to 2,047,041.
- New drill cutting samples were processed for shipment to Energy, Mines and Resources Canada from 345 wells for a yearly total of 25,068 vials.
- Samples shipped to Energy, Mines and Resources Canada totalled 27,274 vials from 345 wells.
- Cores examined on premises came from 1,844 wells for a total of 29,394 boxes.
- Samples examined on premises came from 402 wells for a total of 37,648 vials.
- Users of the examination facilities totalled 117. Of these, 97 were from industry and represented 74 companies, while 20 represented six other organizations.
- Cores loaned out from the premises for study and/or analysis in other facilities came from 54 wells for a total of 1,015 boxes.
- Number of rock thin-sections, rock slabs and diamond polished sections prepared were 62, 573 and one respectively.

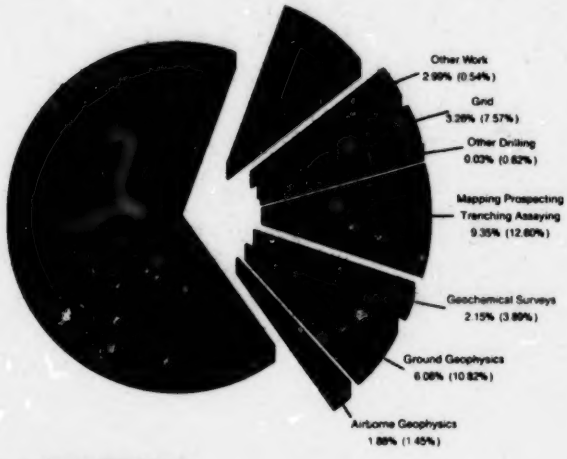
Mineral Development Branch

The branch is responsible for evaluating technical reports submitted as assessment work by the mineral industry under the Mineral Disposition Regulations 1986, and for maintenance of the historical exploration record represented by these reports. Also administered are the Saskatchewan Mineral Deposits Index and the offices of the resident geologists in La Ronge and Creighton. In addition, the branch undertakes geological studies of metallic mineral deposits and disseminates information about these, and about mineral industry activities and mineral development opportunities at both technical and general levels.

The yearly volume of assessment submissions provides an indication of the level of exploration activity, although it is not an absolute measure. A total of 2120 submissions were received for claimed expenditures of $57.75 million (up 82 per cent from

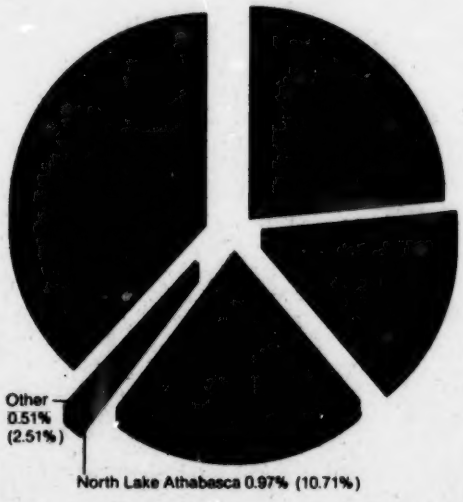
1988-89). These are broken down into specific exploration activities in Figure 4 and into regions in Figure 5.

Figure 4 - 1989-90 Assessment Credits by Activity.



( ) denotes 1988-89 figures

Figure 5 - 1989-90 Assessment Credits by Region.



( ) denotes 1988 - 89 figures

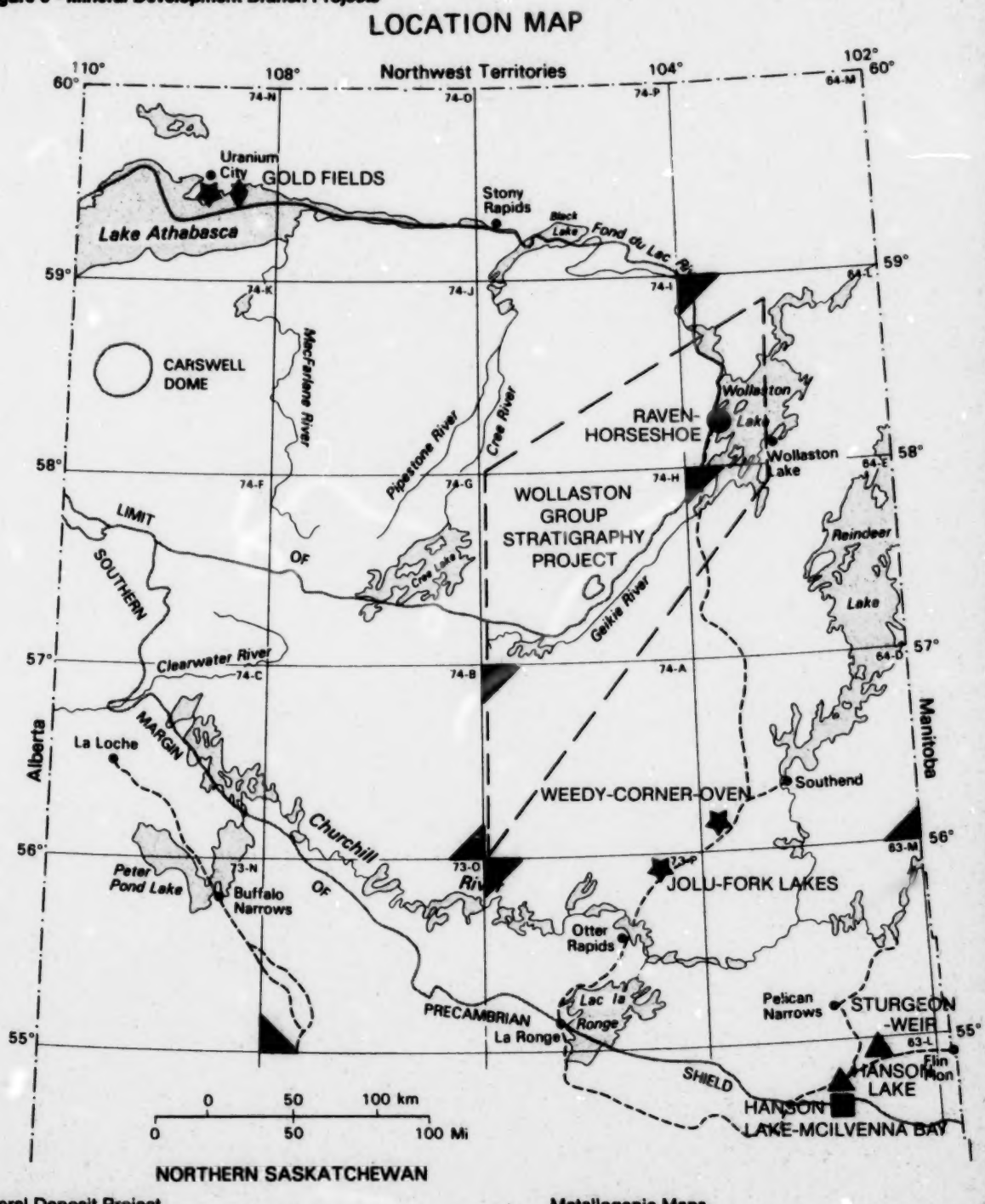
A total of 297 new assessment files were incorporated into the historical record, 142 visitors were received and 155 requests for information handled.

Work continued on the Saskatchewan Mineral Deposits Index with documentation of new and updating of existing occurrences. Data from all identified deposits, numbering 2744, are microcomputer-entered. The index provides a primary reference for mineral exploration and land use planning. Requests for information totalled approximately 40.

The resident geologists, through offices in La Ronge and Creighton, monitor the mineral exploration industry in northern Saskatchewan and also assist it by providing up-to-date information on exploration and mining activities and opportunities. In the current fiscal year, both resident geologists were headquartered in La Ronge and the Creighton office continued to be operated on a part-time basis. The La Ronge office maintains files of current mineral claims, topographic maps, airphotos, geological maps and reports, and assessment work submissions. The Creighton office has current claim maps and one of the resident geologists from La Ronge was available for consultation at specified times throughout the year. In the current fiscal year, over 1470 visitors were received at the resident geologists' offices.

Studies of metallic mineral deposits in northern Saskatchewan were expanded in scope from previous years under the new Mineral Industry Diversification Program. A wide range of deposits and their geological environments were targetted by projects conducted by branch staff and through external contracts (Figure 6).

Figure 6 - Mineral Development Branch Projects



Gold deposit investigations were undertaken in the La Ronge Gold Belt, in the Byers Fault area (Weedy and Oven-Corner deposits) by branch staff and in the Star Lake area (Jolu and Fork Lakes (Jasper-Joyce) mines) under contract by the University of Waterloo. A geochemical project, also under contract to the University of Waterloo, was continued in the Goldfields area south of Uranium City on the Frontier deposit and historic Box and Athona Mines. All these areas are being actively explored for gold by the mineral industry and mining is in progress at the Jolu and Fork Lakes mines. A second project in the Goldfields area focussed on stable and radiogenic isotope determinations on minerals from polymetallic uranium-gold-platinum group element deposits, which represent a newly recognized type of precious metal mineralization. The work, which will establish deposit age and conditions of formation, was carried out under contract by the University of Saskatchewan.

Branch staff completed geological mapping and drill core studies at Hanson Lake around the historic Western Nuclear lead-zinc mine and the recently discovered McIlvenna Bay zinc-copper prospect, to determine the stratigraphic setting of these deposits.

Two uranium projects were contracted to the Saskatchewan Research Council. The first, ongoing from 1988-89, examined Wollaston Group stratigraphy in relation to the uranium deposits of the Athabasca Basin, the second, involved geochemical and mineralogical investigations of the presently subeconomic Raven-Horseshoe deposits south of the Rabbit Lake mine.

Unusual occurrences of beryl-bearing granite pegmatite in the Hanson Lake-Sturgeon Weir area were documented, sampled and geochemically analysed by branch staff to determine potential for rare metals. However, only low concentrations of economically interesting metals were detected.

Coombe Geoconsultants of Regina were contracted to prepare a summary report, "Base Metals in Saskatchewan", to promote mineral industry interest in exploration in the province. A previous, very successful publication entitled "Gold in Saskatchewan" by the same author provided a precedent for this work.

The mineralized core collection, stored in La Ronge and administered through the office of the resident geologists, received additions totalling some 2855 metres from uranium deposits in the Athabasca Basin and from gold and base metal deposits in the La Ronge and Flin Flon regions. Some 23 people examined core from the collection during the fiscal year. The La Ronge office also collected 2594 metres of sedimentary cores from the Athabasca Basin and Phanerozoic section south of Flin Flon.

The Prospectors' School, traditionally run by branch staff in La Ronge, was not held in the spring of 1989 due to a decision by Northlands Career College to defer the school due to low industry interest in potential graduates.

The 1:250,000 scale metallogenic map series established in 1984-85 received ongoing attention. These maps provide details of location, metal association, development status and type of mineralization, as well as reference to information on all noted mineral occurrences. They augment a similar scale compilation bedrock geology series and provide a valuable reference for the mineral exploration industry. One new sheet (Ile a la Crosse, 730) was released in 1989-90 with a further two in preparation or editing at year end.

Mines Branch

This branch is responsible for the disposition, development and conservation of all Crown minerals with the exception of petroleum, natural gas, helium and oil shale. The activities of the branch are carried out through the Mining Lands Section and the Mines and Statistics Section.

Mining Lands Section

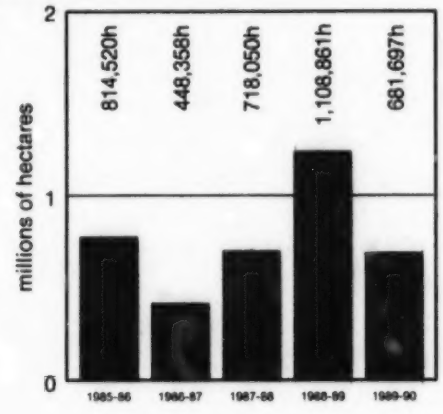
Mining Lands administers and disposes of Crown minerals under the following regulations:

- The Mineral Disposition Regulations, 1986 (uranium, base and precious metals, other minerals)
- The Quarrying Regulations, 1957 (sand, gravel, clay, bentonite and other quarriable substances); these regulations are currently under revision
- Alkali Mining Regulations (sodium sulphate)
- The Coal Mining Regulations, 1988 (coal)
- The Subsurface Mineral Regulations, 1960 (potash, salt)

Activities of the section are centered in Regina, with a field office maintained in La Ronge to permit local administration of regulations. A major project undertaken during the year was the computerization of all the disposition files. To date all the pertinent text files have been entered onto the system. Work is in progress to develop the capability of recording disposition maps graphically on the system.

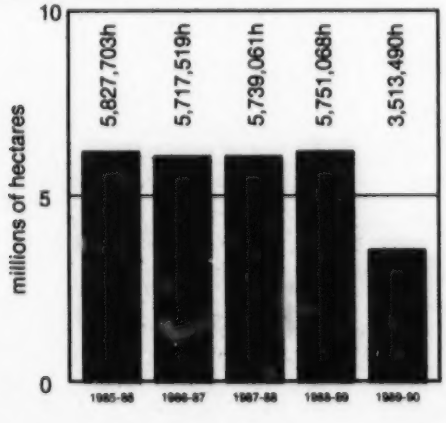
A total of 1,240 new mineral claims, covering 633 197 hectares, was issued during the year pursuant to The Mineral Disposition Regulations, 1986. Of the new claims staked, 79 per cent were staked in the Southern Mining District representing 53 per cent of the total area staked. This high level of activity in the Southern Mining District reflects a continued interest in the diamond exploration play plus an interest in placer minerals.

Figure 7 - New areas acquired under claims and permits



As of March 31, 1990, there were 2 775 720 hectares held under 4,190 mineral claims; 220 849 hectares held under 7 prospecting permits; and 516 921 hectares held under 292 leases for a total area of 3 513 490 hectares (Figure 7). These numbers reflect the correctstatistics pertaining to dispositions issued pursuant to The Mineral Disposition Regulations, 1986. In entering the disposition data into the newly developed computer file it was discovered the cumulative statistics previously reported contained a significant error factor with respect to the total areas of land under disposition.

Figure 8 - Total areas under disposition (claims, permits, leases)



In the year under review, 15 prospecting permits, covering 29 935 hectares and 92 leases covering 4 830 hectares were issued under The Quarrying Regulations, 1957. Of the 15 prospecting permits, seven were issued for kaolin, silica sand, dolomite and/or limestone. At year end, 52 916 hectares were held under 31 prospecting permits and 33 543 hectares were held under 1,205 leases.

Fifty-three leases covering 6 304 hectares were issued, pursuant to the Coal Disposition Regulations, 1988, increasing the total hectares under coal lease to 124 295. No coal prospecting permits were issued, however, 35 were surrendered, reducing the total number of active permits to 15 covering an area of 9 984 hectares.

No alkali mining leases were issued during the year, leaving the total alkali dispositions held on March 31, 1990 at 36 leases covering 13 371 hectares.

Under The Subsurface Regulations, 1960, 10 potash leases exist, covering 213 633 hectares. One permit was taken to lease, reducing the area under potash permits to 83 371 hectares.

Mines and Statistics Section

The major functions of the Section, consisting of two personnel, are to:

- monitor mining developments and operations for those minerals for which the Branch has responsibility;
- acquire, validate, process, record and maintain historical statistical data on production and sales of potash, uranium, coal, precious and base metals, sodium sulphate, salt and other industrial minerals;
- prepare revenue and economic forecasts for the base and precious metals sector of the industry;
- co-ordinate the department's review and response to project submissions referred by Saskatchewan Environment and Public Safety as part of the environmental impact assessment process and, evaluate those projects submissions dealing with mining developments; and
- provide technical advice and assistance related to mining to other branches and divisions in the department.

During the fiscal year required annual plans, showing mined out areas, were acquired from 16 operating mines. In January 1989, the Jolu gold mine started commercial production, replacing Star Lake gold mine, whose reserves ran out at the end of 1988, as the only producing gold mine in the province. The only bentonite mine closed its operations, in March 1990. One operating uranium mine and two in the advanced stages of development were visited as part of the monitoring task. A record book of developments at the individual mining projects was created and has been manually updated.

Branch staff co-ordinated the review of 40 environmental submissions, which were referred to the department. Twelve dealt with mining developments and were evaluated by the section staff. Branch staff participated in meetings pertaining to the evaluation process.

Statistical data on production and the value of sales for potash, uranium, coal, gold, sodium sulphate, bentonite and sand and gravel were tabulated to produce monthly, quarterly and yearly summaries. This information was made available to other government departments and agencies, as well as 39 individuals and organizations. Branch staff continued working with representatives from other provincial governments on the collection and reporting of statistical data for the mining industry. During the fourth quarter of 1989, branch staff started providing provincial statistics on exploration to the Mining Association of Canada for studies they were undertaking for their membership. Branch staff handled numerous external requests for information pertaining to the mining industry in the province.

Several economic and fiscal forecasts were prepared on the base and precious metal sector of the industry. Branch staff undertook technical reviews and met with industry representatives to discuss the progress of these studies.

Petroleum and Natural Gas Division

Bruce Wilson
Executive Director

The Petroleum and Natural Gas Division has major responsibilities in all areas related to provincial jurisdiction over oil and gas resources including disposition and management of Crown oil and gas rights; well licensing and surveillance of all exploration, development and production operations; oil and gas conservation including determination of reserves and producibility estimates; maintenance of production and disposition statistics; crude oil marketing; and royalty and tax legislation.

The responsibilities of the division are carried out through the operation of five branches:

- Geology and Petroleum Lands Branch
- Engineering Services Branch
- Economic and Fiscal Analysis Branch
- Petroleum Development Branch
- Petroleum Statistics Branch

Continued uncertainty regarding oil prices, high interest rates and various industry rationalization efforts last year combined to produce the lowest level of oil well drilling in more than a decade. Fortunately, natural gas activity rose to an all time record level in 1989. A total of 1,498 wells were drilled in 1989 with 365 wells being completed as potential oil producers and 960 wells completed as potential gas producers. It is interesting to note that 1989 was the first year on record that gas well drilling numbers exceeded those for oil.

Land sale interest remained relatively strong in 1989 with total revenues of $36.3 million. This represented a slight increase from the $35.0 million received in 1988. There was a 70 per cent increase in the volume of oil and gas rights sold in 1989 compared with the previous year with most of the increase being in the form of exploratory acreage offered under permit or drilling reservation. Indicative of the current interest in natural gas, approximately 58 per cent of the land sale revenue in 1989 was derived from gas prone lands.

Crude oil production dropped slightly to 11.6 million cubic metres in 1989 compared with 12.3 million cubic metres in 1988. The drop was in response to the low level of exploration and development activity. Natural gas production on the other hand continued to increase with 1989 gas production amounting to 6.1 billion cubic metres; a 30 per cent increase from the previous year.

While natural gas activity stole the spotlight in 1989, there were positive signs for the future of our oil industry in the form of technological advancements and expanded market opportunities. Horizontal drilling is being tested in various types of reservoirs in the province and results have generally been positive. This drilling technique has the potential to increase recovery rates and reduce costs. A total of 13 horizontal wells were drilled last year and the number is expected to grow dramatically in the years ahead. From a marketing perspective, the NewGrade heavy oil upgrader approached capacity production levels by the end of the fiscal year following various start-up problems. Work on the Bi-Provincial upgrader at Lloydminster also continued on schedule with an expected start-up date of late 1992. These facilities will provide a stable market for the province's heavy oil production and encourage development of this significant resource.

Petroleum Development Branch

The Petroleum Development Branch is primarily responsible for ensuring that the field operations of the province's oil and gas industry meet acceptable technical and environmental protection standards, that well licensing proceeds in accordance with regulations established under The Oil and Gas Conservation Act and that geophysical activities occur in accordance with The Sedimentary Basin Geophysical Exploration Regulations.

The Regina staff:

- directs field office operations;
- processes and approves applications for well drilling licences;
- enters initial data for the Well Information System;
- maintains records and control of well deposits made to guarantee proper drilling, completion and abandonment of wells;
- processes and approves well ownership and name changes;
- advises of offset drilling commitments on Crown land;
- processes weekly drilling reports and compiles statistical data relating to drilling activity;
- represents the department on oil spill co-operatives; and
- processes and approves applications for Geophysical Licences, Crew Certificates and Blasters Permits.

The field office staff:

- collects and compiles drilling, completion and reservoir data;
- enforces regulations, orders and policies pertaining to pollution control in the oil and gas industry;
- checks standards, procedures and equipment used by industry in drilling, producing and abandonment of wells;
- witnesses production tests;
- performs on-site inspections of all wells and facilities;
- investigates and assists in resolving landowner problems associated with the use of land for geophysical activity, exploration and production; and

- investigates, reports and ensures that industry act promptly and efficiently in handling oil and salt water spills.

Regina staff continued to upgrade the Well Information System as well as add new well licences and the information associated with its drilling. They are also responsible for the maintenance of up to date wall maps which give such information as well type, completion horizon and pool boundaries. Industry, the general public and various department personnel make extensive use of the maps. Similar maps are maintained by each of the four field offices for their specific areas, and are also used by many.

In addition to issuance of drilling licences mentioned under the Drilling Activity heading, the branch also called 145 offset commitments on Crown lands. Offsets are created by freehold mineral wells being placed on production adjacent to Crown land. Seismic and logging crew numbers increased slightly. This year staff issued 61 geophysical licences, 104 crew certificates and 216 blaster permits. Well ownership changes were registered on 4,455 wells with name changes being made on 1,705 wells. A large number of inquires continue to be handled regarding drainage units, target areas and the requirements necessary when drilling, producing and abandoning oil or gas wells in the province.

Environmental surveillance is ongoing with field staff conducting numerous inspections. During the year in excess of 35,000 inspections were carried out on well, battery and rig sites, clean-up was monitored on 598 oil and salt water spill sites, approximately 250 drilling mud pits were inspected to ensure that proper disposal techniques were being employed and 51 landowner related complaints were resolved.

Field staff also inspected, acquired and reported on all of the drilling, completion and abandonment activity, carried out 1,448 pressure maintenance/ water disposal well checks and witnessed 444 production test audits. Staff are continuing to monitor drilling mud disposal and retained the Saskatchewan Research Council to finalize their investigative work. Regulations were implemented to establish an Environmental Fund which will replace the outdated well deposit system. The fund can be used by the department to undertake well abandonment and surface restoration work when a company has gone into receivership or to handle spill clean-up where the responsible party cannot be readily identified.

Drilling Activity

Drilling activity in 1989 decreased in comparison with 1988 activity. The decrease was all the result of less oil well drilling primarily attributed to declining prices. The decreased numbers of oil wells were somewhat offset by increased gas well drilling as the province enjoyed the largest number of gas wells drilled in its history.

A total of 1,498 oil, gas, service and dry holes were drilled during 1989. This activity is broken down as follows: 365 oil wells, 960 gas wells, 23 service wells and 150 abandoned dry holes. Overall this results in a 90 per cent success rate. Figures 8 and 9 give a breakdown by area of the respective numbers of wells and meterage drilled. Well licensing totalled 1,524 compared to 2,175 in 1988.

Figure 9
Wells Drilled by Area

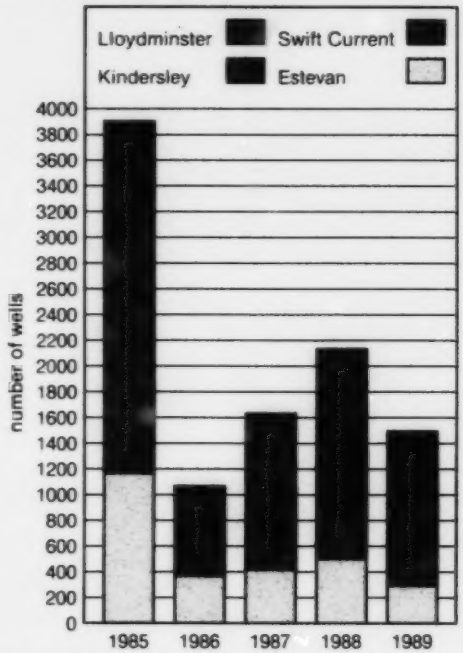
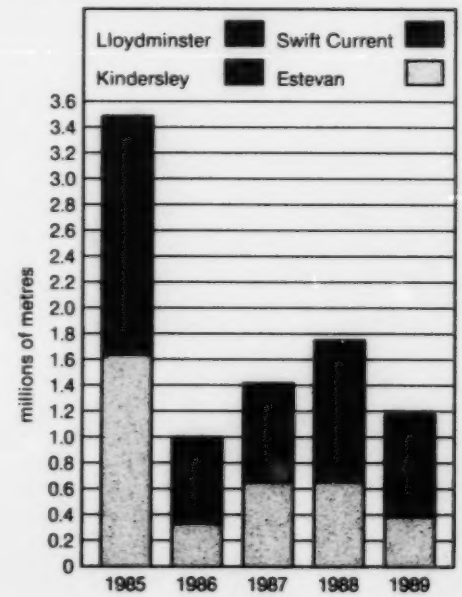


Figure 10
Metres Drilled by Area



Engineering Services Branch

The Engineering Services Branch evaluates Saskatchewan's crude oil and natural gas reservoirs to ensure that exploration, development and production of these resources follow good conservation and engineering standards. Sound management of these resources is essential to achieve efficient production and ensure maximum benefits from development. The mandate for these responsibilities comes from The Oil and Gas Conservation Act, The Crown Minerals Act, The Pipe Lines Act and respective regulations.

Specifically this branch:

- determines crude oil and natural gas reserves for use by industry and government in planning and developing policies;
- evaluates industry applications for enhanced oil recovery projects, horizontal drilling projects, waste water disposal wells, off-target wells and other proposals and participates in public inquiries held to consider these applications;
- assesses unitization proposals to ensure that Crown lands receive fair and equitable unit participation;
- evaluates industry submissions for incremental oil production from waterflood and enhanced oil recovery projects to establish reduction to Crown royalties and freehold production taxes;
- establishes pool boundaries, well spacing and target areas to facilitate orderly crude oil and natural gas development;
- issues maximum permissive production rates for oil wells and daily allowables for gas wells, and monitors production to ensure that these rates are not exceeded;
- issues construction and operating permits for oil and natural gas pipelines and witnesses pressure tests conducted to ensure that pipelines meet operating standards;
- prepares for publication, pertinent engineering, development and production data for oil and natural gas pools, including monthly demand for Saskatchewan crude oil;
- monitors crude oil markets and tabulates nominations for crude oil; and
- provides technical expertise and assistance to other branches and divisions in the department.

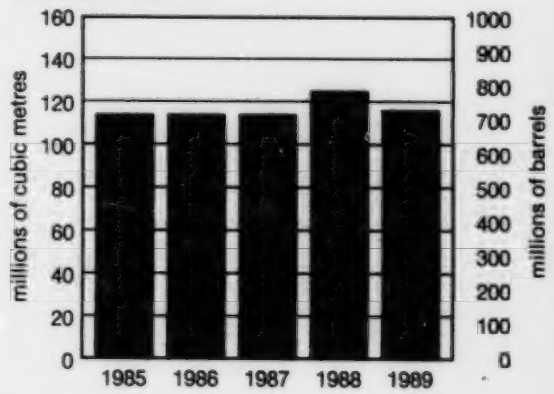
Highlights

- Thirteen additional horizontal wells were drilled in the province in 1989 following the successful drilling and completion of Saskatchewan's first horizontal well by Sceptre Resources Limited in the Tangleflags area in 1987. Three horizontal wells were drilled in the province in 1988.
- The deregulation of natural gas markets and prices in the province in 1987 prompted unprecedented gas exploration and development activity which resulted in an all time gas well drilling record in the province in 1989 of 960 wells exceeding the previous records of 742 wells in 1988 and 568 wells in 1987.
- Seven new units and unit expansions were approved in 1989 to accommodate new or expanded waterflood projects. Twenty four waterfloods and modifications were approved in 1989. Fourteen Orders-in-Council for statutory unit operating agreements were amended.

Crude Oil Reserves

- Saskatchewan's remaining established crude oil reserves have decreased by an estimated 4.926 million cubic metres to 115.774 million cubic metres in 1989. This is the net result of an increase in initial reserves of 6.674 million cubic metres and production of 11.6. This reserve decrease is largely attributed to the lack of significant drilling activity.
- The department estimates that the potential enhanced oil recovery reserves are 667 million cubic metres with 89 per cent of these reserves classified as heavy oil.
- These potential reserves are an indication of the oil that can be recovered assuming that enhanced oil recovery techniques are successfully applied. Considerable technical risk currently exists requiring further research and experimentation.

Figure 11
Remaining Oil Reserves

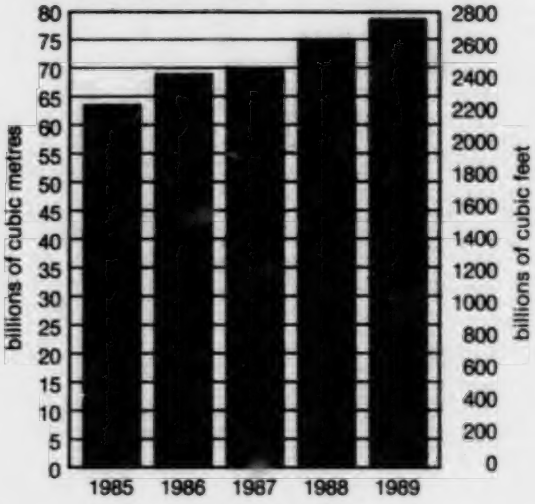


Natural Gas Reserves

- Saskatchewan's remaining established natural gas reserves were increased by an estimated 4.2 billion cubic metres to 78.6 billion cubic metres in 1989. This is the net result of an increase in initial reserves of 9.6 billion cubic metres less production for sales of 5.4 billion cubic metres.

- The department estimates that the remaining ultimate potential which includes established reserves could reach 175 billion cubic metres. Additional exploration and development is required for better evaluation.

Figure 12
Remaining Gas Reserves



Crude Oil Production

- Oil production in 1989 was 11.6 million cubic metres compared to 12.3 million cubic metres in the previous year. This slight decrease was the result of generally weak drilling and enhanced oil recovery activity. On average, there was minimal shut-in of production due to marketing difficulties and pipeline capacity in 1989.
- Saskatchewan's oil production is made up of different qualities of crude commonly identified as light, medium and heavy found in different geological zones and geographical areas. In 1989, approximately 29.4 per cent was heavy oil, 37.1 per cent was medium and 33.5 per cent was light.

Figure 13
Crude Oil Production

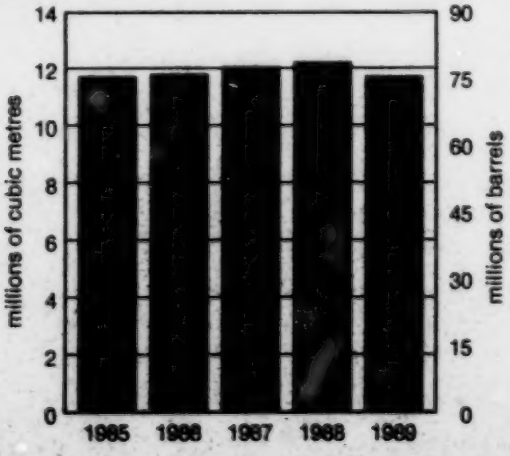
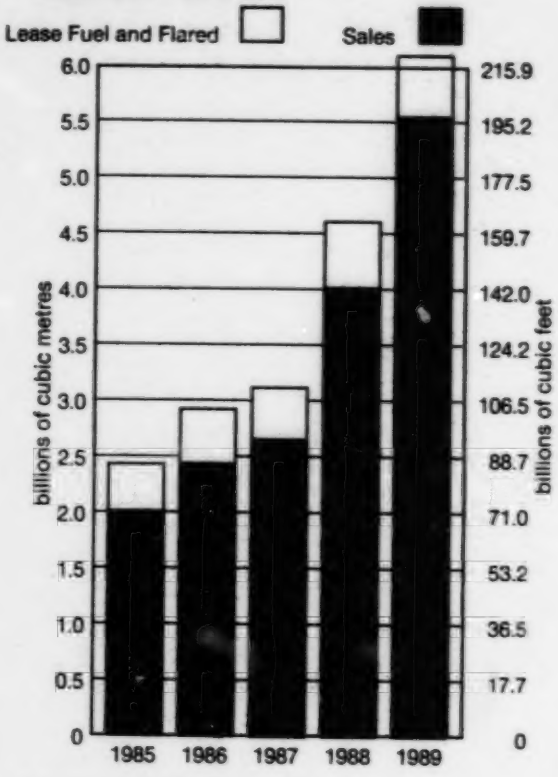


Figure 14
Quality of Saskatchewan Crude Oil Production by Area for Calendar Year 1989

Natural Gas Production

Natural gas production in 1989 was 6.1 billion cubic metres, an increase of 30 per cent from the previous year when it was 4.7 billion cubic metres. Sales of the province's natural gas were 5.5 billion cubic metres with the remainder of the production used for lease fuel or flared. Approximately 2.6 billion cubic metres of natural gas were exported from the province in 1989. Natural gas production will progressively increase because of better access to the export market as a result of deregulation. This will allow the province's shut-in reserves to be developed and produced as well as causing further exploration.

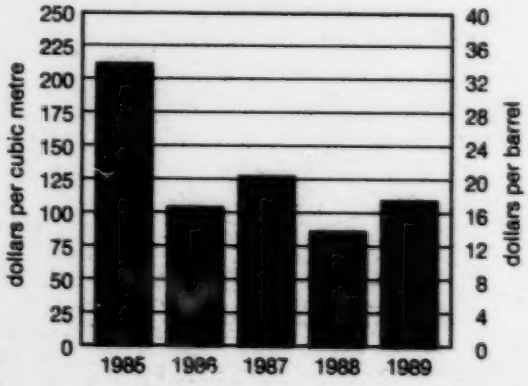
Figure 15
Natural Gas Production



Average Crude Oil Prices

The average 1989 Saskatchewan crude oil price of $107.10 per cubic metre represents a 27 per cent increase over the $84.13 per cubic metre average for 1988. This increase follows the trend in world oil prices over that time period.

Figure 16
Average Crude Oil Prices



Geology and Petroleum Lands Branch

Geology Mapping and Land Evaluation Section

This section has two principal responsibilities: geological mapping and land evaluation.

Geological Mapping Unit

Geological maps (mainly structure contour maps) are drawn and maintained for all oil and gas producing areas in the province. The maps are used for land evaluation, for reserve calculations in the Engineering Services Branch and in helping solve problems related to the producing areas. At the end of the fiscal year, 125 pool structure contour maps were being maintained. The maps may be purchased from the department's Marketing and Publications Branch.

In carrying out their mapping work, geologists acquire a detailed knowledge of the geology of the producing oil and gas pools. This expertise is put to use within the Petroleum and Natural Gas Division when staff members are asked to make recommendations on submissions from industry or in dealing with other administrative matters.

Industry submissions in the reporting period included applications for pressure maintenance of producing units, conversion of wells to salt water disposal, and secondary recovery of oil by waterflood. As well, requests were received for permission to drill wells outside the approved spacing pattern and for abnormal well spacing patterns.

Information and advice were made available to other branches, departments and the general public on requests ranging from the interpretation of the economic geology of known oil and gas accumulations to the hydrocarbon potential of unexplored prospects.

Land Evaluation Unit

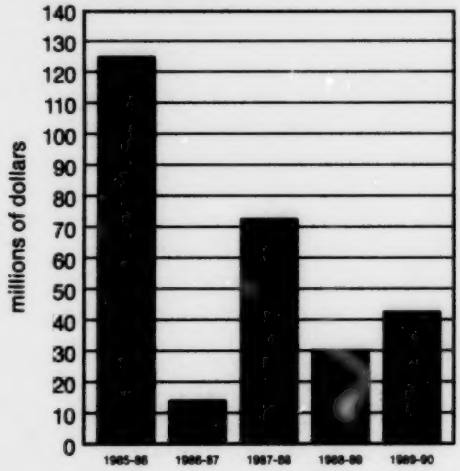
The economic potential of hydrocarbon resources underlying specific areas of the province is determined as required by the department. Monetary evaluations of reserves are primarily for land sales. As well, this unit:

- reviews and recommends requests from industry for the posting of specific Crown mineral lands at department land sales;
- prepares sales notices and technical data for sales;
- reviews and recommends acceptance or rejection of bonus bids received from industry on posted lands;
- evaluates and selects Crown acreage in drilling reservations when such reservations go to lease;

- administers net royalty leases and inspects non-unit net royalty leases and farmouts to ensure compliance with the terms or agreements made with the department;
- reviews requests for waiver of offset well commitments on leases adjoining certain freehold lands producing oil or gas and makes follow-up recommendations;
- advises industry and the general public concerning the value of mineral rights for specific areas.

Four sales of Crown petroleum and natural gas rights were held during the 1989-90 fiscal year. Revenues totalled $40,371,020.31. This compares to $29,724,179.93 received during the previous fiscal year. Dispositions of mineral rights in the 1989-90 fiscal year totalled 1,211,022 hectares (2,992,501 acres) consisting of 97 permits containing 911,417 hectares (2,252,160 acres), one special agreement block containing 53,095 hectares (131,200 acres), 17 drilling reservations comprising 36,555 hectares (90,329 acres), and 945 lease parcels consisting of 209,956 hectares (518,812 acres). Revenue derived from the sale of petroleum and natural gas rights for the past five years is shown in Figure 17.

Figure 17
Revenue Received from Sales of Crown Petroleum and Natural Gas Rights.



Petroleum Lands Section

This section has three principal responsibilities: disposition administration, disposition review and registration.

Disposition Administration

This responsibility involves the administration and disposition of approximately 5.4 million hectares (13.2 million acres) of Crown mineral lands under The Petroleum and Natural Gas Regulations, 1969; The Helium and Associated Gases Regulations, 1964; The Oil Shale Regulations, 1964; The Crown Minerals Act, and The Oil and Gas Conservation Act.

The number of petroleum and natural gas permits under disposition increased from 116 at April 1, 1989 to 187 at March 31, 1990 with an increase in area from 861,158 hectares (2,127,967 acres) to 1,639,985 hectares (4,052,492 acres). Drilling reservations under disposition increased in the same period from 14 to 20 with an increase in area from 27,288 hectares (67,429 acres) to 42,771 hectares (105,690 acres). Petroleum and natural gas leases in effect increased from 11,437 at April 1, 1989 to 11,529 at March 31, 1990. Area under lease totalled 2,990,743 hectares (7,390,288 acres). Lands under helium leases increased from nine to ten with an increase in area from 21,548 hectares (53,247 acres) to 25,360 hectares (62,667 acres) at March 31, 1990. Helium permits increased by one permit to 21 with an increase in area from 533,667 hectares (1,318,720 acres) to 566,431 hectares (1,399,682 acres) at March 31, 1990. Oil shale permits remained the same at three covering an area of 52,059 hectares (128,640 acres). A total of 11 gas storage agreements were in effect totalling an area of 39,106 hectares (96,633 acres).

Disposition Review

All expiring dispositions are reviewed annually to establish whether they will remain active for another year. A total of 6,503 dispositions were subject to review in March, 1990 which represents an increase of 645 dispositions from the 5,858 reviewed in March, 1989.

Registration

This responsibility involves the monitoring, recording and registering of transactions directly affecting all dispositions through transfers, amalgamations, encumbrances or securities.

A monthly average of 528 transactions occurred in 1990 which represents a 22 per cent increase from the monthly average of 414 in the previous year. The number of transactions affecting dispositions increased from 4,974 at April, 1989 to 6,330 at March, 1990. Searches decreased from 4,910 at April, 1989 to 3,740 at March, 1990. The highest monthly total for searches in the fiscal year was 533 in the month of May. The monthly average of searches decreased from 409 in the previous year to 311 ending March, 1990.

Economic and Fiscal Analysis Branch

The Economic and Fiscal Analysis Branch evaluates, designs and implements oil and gas Crown royalty and freehold production tax systems and exploration/development incentive systems to maximize provincial revenues while maintaining an active oil and gas industry. In addition, the branch provides production, revenue, expenditure and employment forecasts related to Saskatchewan's oil and gas fields.

Functionally, the branch is divided into the Royalty/Tax Analysis Section and the Incentive Administration Section.

Royalty/Tax Analysis Section

This section analyses, designs and amends the crude oil and natural gas Crown royalty and freehold production tax regimes cited within The Petroleum and Natural Gas Regulations, 1969 and The Freehold Oil and Gas Production Tax Regulations, 1983. The production, revenue and employment forecasts for internal and external uses are also prepared by this section.

More specifically, this section:

- evaluates the economics of crude oil and natural gas exploration, development and production under varying federal and provincial fiscal arrangements;
- analyses, develops and proposes royalty and tax incentives to encourage implementation of enhanced oil recovery schemes, (e.g. waterfloods, steamfloods, carbon dioxide floods) and drilling techniques (e.g. horizontal wells);
- monitors and forecasts crude oil prices, gross oil revenues, provincial revenues, oil production and related oil expenditures and employment for internal government use;
- analyses the impact of changes, (e.g. world prices, exchange rates) that affect oil and gas activity in the province and surrounding jurisdictions;
- provides analytical assistance pertaining to upgrader negotiations and consumer gasoline inquiries;
- monitors revenue sharing between governments and industry;
- prepares submissions to boards, commissions and other external bodies on future crude oil supplies;
- prepares information circulars, directives and notices to keep industry informed of changes; and
- performs the necessary consultation process with industry and other departments regarding policy changes.

Continuing crude oil price volatility resulted in amendments to royalty/tax levels on seven separate occasions during 1989 in accordance with the price sensitive policy.

While conventional oil well drilling was at its lowest point since the mid 70's, interest in horizontal well technology continued to expand. The granting of EOR royalty/tax status to all horizontal wells drilled prior to 1991 played a major role in encouraging 13 horizontal wells to be drilled in 1989.

On the natural gas side, detailed analysis was performed pertaining to the possible implementation of a royalty/tax structure on associated natural gas production. Royalty/tax options have been developed and presented to industry for structural and administrative comments. The branch also continued to analyse and develop new policies and procedures to deal with the continuous evolution going on within the natural gas industry since deregulation.

Incentive Administration Section

The Incentive Administration Section is responsible for the development, analysis and administration of incentive programs offered by the province to promote increased activity. The section closely monitors the cost effectiveness of these incentive programs to ensure maximum return for the province's incentive dollar and to maintain a positive climate for development and exploration in the province.

The major duties of this section include the following:

- analyse, develop and monitor oil incentive systems to maintain maximum recovery of oil reserves under various recovery schemes and to maintain new oil development and exploration activity in the province;
- analyse and make recommendations to encourage the continued production of old wells under the Workover Incentive Program;
- evaluate and make recommendations on acceptable bonus bid offers to convert net royalty leases to standard Crown leases in order to enhance production and revenues;
- determine the initial holiday status of wells as noted on the "Application for Licence to Drill a Well";
- review and make recommendations in regard to holiday extensions due to marketing restrictions or other exceptional circumstances;
- evaluate and analyse the exploration, development and production incentive systems of the federal government and other provinces;
- monitor and forecast exploration and development expenditures;
- monitor and forecast operating costs associated

with the production of crude oil;

- prepare information letters and policy directives;
- conduct economic and engineering analyses on special issues, wells and/or projects;
- prepare monthly crude oil reports.

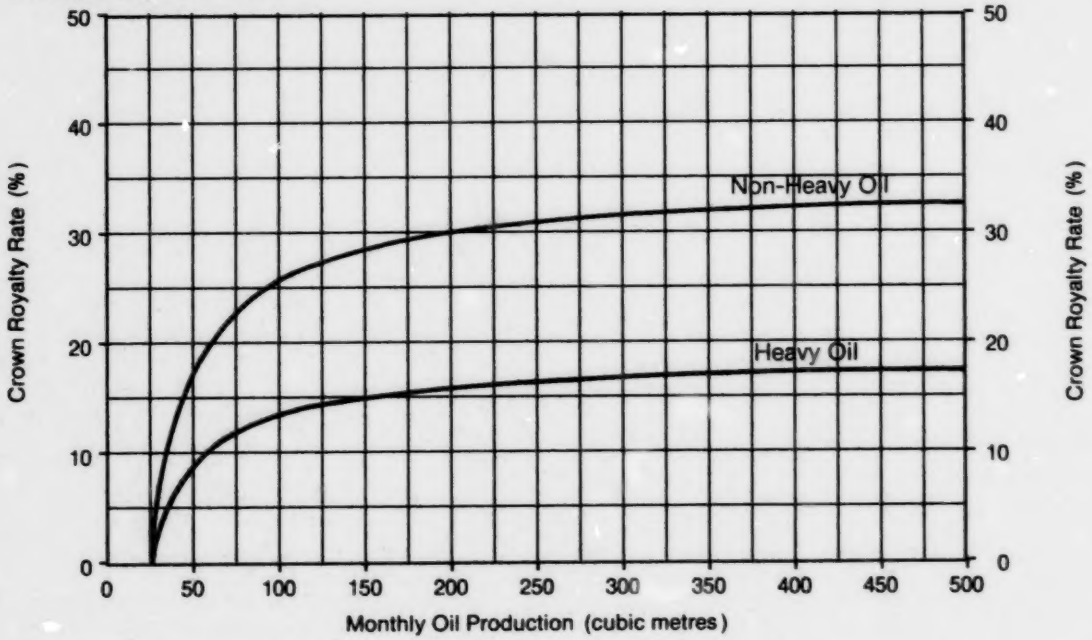
This section reviews all requests related to the administration of the oil royalty/tax holiday program. Under the program in 1989, newly drilled special development wells and incremental production from new or expanded waterflood projects qualified for a two year royalty/tax holiday. Infill wells continued to qualify for a one year holiday, non-deep exploratory wells and deep development wells for a three year holiday and deep exploratory wells for a five year holiday.

In 1989, 452 oil wells were licenced to be drilled in Saskatchewan. Of the total oil well licences issued, 67 were infill wells on undrilled drainage units qualifying for a one year royalty/tax holiday, 296 were special development wells qualifying for a two year royalty/tax holiday, 42 were non-deepexploratory wells qualifying for a three year royalty/tax holiday, five were deep development wells qualifying for a three year royalty/tax holiday and seven were deep exploratory wells qualifying for a five year royalty/tax holiday. The remaining 35 licenced wells did not qualify for a royalty/tax holiday. In total, 355 of the wells drilled in 1989 were successful and completed as oil producers.

A number of economic and technical evaluations were carried out by this section pertaining to the Workover Incentive Program. This program encourages operators to maintain or improve production from marginal old oil wells when significant expenditures are required. In 1989, the department approved approximately $3.6 million in incremental expenditures under this program.

The deadline for application under the special provisions introduced in 1987 for recovery of outstanding incentive balances under The Approved Expenditure Grant Program was extended from February 28, 1989 to February 28, 1991. By the end of March, 1990, over 200 companies had made application under the program and the outstanding incentive balance had been reduced by approximately 95 per cent.

Figure 18
Conventional Crude Oil Royalty Curves For New Developments, March, 1990



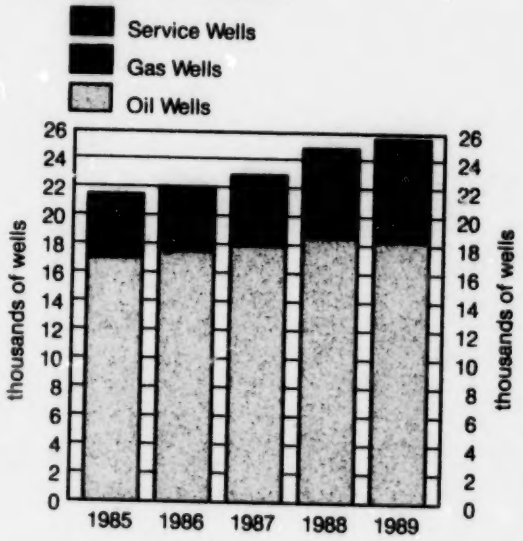
Petroleum Statistics Branch

The Petroleum Statistics Branch is responsible for the collection, processing and management of statistical data on the production and disposition of petroleum resources in the province in accordance with the regulatory requirements of The Oil and Gas Conservation Act and regulations thereunder, for the maintenance and efficient operation of computerized data processing and storage systems, for the administration of the Production Monitoring/ Testing/Auditing Program, for monitoring and evaluation of wellhead oil and gas prices and transportation costs, and for providing statistical services to both internal and external users.

In particular, the branch:

- collects, validates, processes and records statistical data on the production and disposition of crude oil, natural gas, water and other products associated with oil and gas field operation;
- maintains, develops and implements appropriate modifications and enhancements to existing computer systems as well as designs and develops new systems to meet new policy initiatives;
- participates in a joint review process with other western producing provinces and industry task force committees on the development and standardization of all industry reporting forms, procedures and requirements;
- administers and co-ordinates activities of the Production Monitoring/Testing/Auditing Program to ensure proper and accurate measurement and allocation of production among wells tied to a common producing facility with primary emphasis on wells receiving royalty/tax incentives;
- reviews, establishes and informs industry of the appropriate royalty/tax status and length and commencement date of incentive period of new wells/units as well as maintains and updates the status of existing wells/units;
- monitors, analyses and evaluates posted terminal prices and reported wellhead prices of Saskatchewan crude oil and natural gas and the delivered price of that oil and gas to specific markets;
- monitors and investigates oil and gas production and disposition reporting practices to ensure compliance and to provide assistance and interpretation to industry with regard to regulatory requirements;
- reviews, analyses and evaluates pipeline tariffs and trucking costs and its economic impact on provincial royalty/tax revenues;
- monitors, researches and compiles statistical information pertaining to the marketing of Saskatchewan crude oil and natural gas production;
- monitors, assesses and establishes the quality of Saskatchewan crude oil production on an individual well, battery and pool basis;
- prepares for publication various weekly, monthly and yearly statistical reports on the production and disposition of petroleum and mineral resources;
- provides statistical services to petroleum industry, federal and provincial government bodies, consulting firms, universities and the general public.

Figure 19
Wells Capable of Production



The number of wells capable of production is an accurate indication of the volume of statistics that must be collected, processed and managed by the branch each month. During the past year, another net addition of 948 wells was realized bringing the number of wells capable of production to 25,761 in the province.

Petroleum statistics are made available in three periodic reports, Drilling Activity Report, Monthly Oil and Gas Production Report and Mineral Statistics Yearbook. Upon request, statistics can also be obtained in a variety of formats and on magnetic tape, microfiche, diskette or printout. In 1989, revenue generated from subscription of periodic reports and the sale of statistics on a request basis totalled in excess of $72,700.

During the 1989-90 fiscal year, the branch continued to devote much of its effort to the development of a new automated Production and Disposition System (PDS) to replace the existing system that was developed in the late 60's and to prepare the system to meet the department's long term goals for data integration. With the completion of the initial phase

in the previous fiscal year relating to situation analysis of the existing application, identification of functional requirements and the development of a conceptual design for the new PDS, work began on detail system design, system developments, testing and conversion. By fiscal year end, all critical components of the detail system design have been completed with system development, testing and conversion at various stages of completion.

As an integral part of the new PDS developments, the branch also completed an in-depth review of all reporting requirements, procedures and formats. The review was undertaken in conjunction with discussions on standardizations between task force members from the governments of Alberta, British Columbia and Saskatchewan and various industry associations. As a result of this review and extensive consultation process, an information package including all the new and revised reporting forms, instruction directives and code tables was prepared to facilitate industry reporting under the new PDS commencing January 1, 1990. Industry seminars were also held in Calgary, Estevan and Regina to outline to industry the new reporting requirements and procedures.